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# PARADISE FOUND



## PARADISE CREEK RESTORATION PLAN

August 1, 2003

*Prepared by*

THE Elizabeth River Project

*Team Paradise*



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# PROJECT SPONSORS

*National Fish and Wildlife Foundation, Chesapeake Bay  
Small Watershed Grants Program, Community Legacy Grant  
Chesapeake Bay Program  
US Environmental Protection Agency  
Omega Protein  
Ocean Trust  
National Fisheries Institute  
National Oceanic and Atmospheric Administration Restoration Center  
Portsmouth General Hospital Foundation  
TetraTech FW, Inc. (formerly Foster-Wheeler)  
Columbia Gas of Virginia/NiSource, Inc., Environmental Challenge Fund  
VA Department of Environmental Quality*

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## KEY PROJECT PARTNERS

Brighton/Prentis Park Civic League	Peck Land Co.
City of Portsmouth	Portsmouth Clean Community Commission
Cradock Business Owners Association	Pull-A-Part
Cradock Civic League	Steve and Peggy Rahimpour
Cradock Middle School	SPSA – Waste to Energy Plant
Cradock Pride Youth	US Army Corps of Engineers
Giant Cement of Virginia	US Environmental Protection Agency
Helping Hands of Cradock	US Navy
National Oceanic and Atmospheric Administration	Virginia Department of Conservation and Recreation
Norfolk Naval Shipyard	Virginia Institute of Marine Science
Old Dominion University	Virginia Marine Resources Commission

## KEEPERS OF THE VISION *Recognized May 17, 2003 for their key support*

<i>Rebecca Hanmer, Director, US EPA Chesapeake Bay Program Office</i>	<i>John Hadfield, Executive Director, SPSA</i>
<i>Col. David Hansen, Commander, US Army Corps of Engineers, Norfolk District</i>	<i>Hon. William E. Moody, Jr., Portsmouth City Council</i>
<i>RADM (Select) Mark Hugel, Commander, Norfolk Naval Shipyard</i>	<i>Hon. Marlene Randall, Portsmouth City Council</i>
<i>Hon. Frederick Quayle, Virginia Senate</i>	<i>Hon. Charles Whitehurst, Portsmouth City Council</i>
<i>Walter I. Priest, III, Virginia Institute of Marine Science</i>	<i>David Peck, Peck Land Co.</i>
<i>Jeff Hancock, Virginia Department of Conservation and Recreation</i>	<i>Steve Levetan, Pull-A-Part</i>
<i>Mark Kalnins, Virginia Department of Environmental Quality</i>	<i>Ted Hinson, Plant Supervisor, Giant Cement of Virginia</i>
<i>Bob Craft, Virginia Marine Resources Commission</i>	<i>Johnnie Wood, Executor, Stuffey Grimes' Boatyard</i>
	<i>Susan Gaston, Omega Protein</i>
	<i>Dottie Wyatt, President, Cradock Civic League</i>



*Team Paradise, stakeholders and technical experts from diverse creek interests, planned the restoration of Paradise Creek. The culminating retreat was at Port Isobel, a private island owned by the Chesapeake Bay Foundation, March 2003.*

## **WE ENVISION A RESTORATION OF PARADISE CREEK THAT:**

- ***Celebrates and promotes awareness of the creek's diverse partnerships***, its rich history and its abundant natural resources, all of which are a source of community pride;
- ***Demonstrates such powerful results in restoration and conservation*** that the creek enjoys national recognition as the model for watershed management that safeguards ecological and human health;
- ***Maximizes quality of life for humans***, who experience Paradise Creek and its shores as a safe, marketable haven providing economic, recreational and educational benefits while also preserving the beauty, peace and natural vitality that are among a creek's greatest gifts.

-- ***Team Paradise***, The Elizabeth River Project, March 16, 2003



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# INTRODUCTION: ONE CREEK AT A TIME

**T**he Elizabeth River Project is pleased to present a plan for the restoration of Paradise Creek, **as a model for how to restore the Elizabeth River and the Chesapeake Bay – one creek at a time.**

Since our incorporation in 1993, The Elizabeth River Project and our partner agencies have completed hundreds of environmental improvement projects. But they have been scattered across the 200-square mile urban watershed of the Elizabeth River, where a diverse array of restoration and conservation methods have achieved award-winning wetland restorations, stormwater innovations and public education, wildlife habitat and pollution prevention advances with industrial partners, and the initiation of a demonstration

effort by the US Army Corps of Engineers to clean the toxic river bottom.

**With this plan, we celebrate the 10-year anniversary of our community partnership by seeking for the first time to concentrate our entire “tool box”** of restoration and conservation options on one small tributary of the Elizabeth River. Our goal is to achieve maximum results in the relatively short period of five years, then move on to achieve a 10-mile corridor of such projects encompassing most of the Southern Branch, plus sections in four river cities, by 2020. We have chosen to start with Paradise Creek and its 2.9 square mile watershed in southeastern Portsmouth, because it presents a microcosm of the challenges and the promise of the rest of our home river.



*Paradise Creek presents a microcosm of the Elizabeth River – its challenges and its promise. Reaching 2.6 miles into Portsmouth from the Southern Branch of the Elizabeth, the creek is lined with industrial facilities to the north and the Cradock community to the south. Open spaces harbor surprising levels of wildlife.*



While old Navy landfills on the shores of Paradise Creek exemplify past abuses, actually making National Priorities (Superfund) listing for the urgency of the contamination, the Navy, its industrial, municipal and residential neighbors are now zealous partners in the creek restoration plan. Meanwhile, we have discovered the surprising resiliency of the creek itself. Despite its intense industrial and residential history, **our staff routinely see on Paradise Creek's open spaces the kind of wildlife you would more expect to find on some remote, rural corner of the Chesapeake Bay.**

**T**his is what I myself have seen, on mere casual visits: I'm sitting in a van with Robin Dunbar, our Outreach Manager, at the former site of Peck Iron & Metal, waiting for team members. From concrete rubble and rusting auto parts, a large fox appears, eyes us, and disappears into the brush. (The Elizabeth River Project is now completing a wetland restoration and reforestation along the shore of this former scrap yard, in partnership with the private landowner. Toward our goal for returning scarred "brownfields" to viable use, the owner may have found a buyer to remediate and redevelop the rest of the site.) Another day, Lyle Jackson, our Paradise Creek Project Manager, and I are taking pictures of the former Grimes boatyard on Victory Boulevard, where we plan a public park with the City of Portsmouth. Picking our way through old pilings, we discover wild asparagus, rooted no doubt during the plantation era, growing taller than Lyle's head. Later, at the Southeastern Public Service Authority's garbage recycling plant on

*Above, the shoreline of former Peck Iron & Metal will be restored on the creek. Below, Project Manager Lyle Jackson discovers wild asparagus on the creek. Fox and hawks are other frequent sightings.*



the creek, planning the event where we will present a draft of this plan to the community: a red-tailed hawk dives in front of us, into SPSA's new wildlife habitat, planted with us last November.

Restoring an urban river is a long and daunting task. Through this planning process, **we have found a Paradise Creek that lives up to its name: holding forth our highest hopes for our river's future.**

- Marjorie Mayfield, Executive Director,  
The Elizabeth River Project





*Volunteers plant native trees upland of the Navy's restored wetland at New Gosport on Paradise Creek.*

## PARADISE FOUND: KEY GOALS

- ***Develop a plan to clean up creek sediments*** determined to pose a serious risk to humans or the eco-system and begin implementation by 2008.
- ***Achieve a habitat corridor of restored and conserved open land***, including wetlands, forests and meadows, for 100 feet inland on the north shore of the creek and on the southern shore as practical, with areas set aside as parks or nature preserves as practical.
- ***Implement innovative solutions to stormwater pollution*** to address those sub-watersheds with highest impact on the eco-system, and provide maximum practical storm water treatment for new developments.
- ***Restore Navy landfill sites*** on Paradise Creek to productive use, helping achieve the relevant goals in this plan for water quality, sediment quality, living resources, and quality of life.
- ***Return at least three Superfund and/or "brownfield" upland sites to productive use*** through elimination of the risks to human and ecological health, resulting in increased marketability of individual properties and the creek area as a whole, and preventing re-contamination of restored sediments.
- Implement a comprehensive public relations and outreach plan ***to educate the citizens about creek restoration, history and stewardship opportunities.***

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***The planning effort kicks off with the highest possible visibility.** Christie Todd Whitman (third from left), former Administrator, US EPA, arrives by boat at Paradise Creek, with US Sen. John Warner (fourth from left). Welcoming Whitman is Portsmouth Mayor James Holley, far left; Tim Keeney, NOAA; John Berry, National Fish and Wildlife Foundation, and Capt. Mark Hugel, Norfolk Naval Station. Marjorie Mayfield, Executive Director, The Elizabeth River Project, and Don Welsh, Region III Administrator, EPA, bring up the rear.*

## HOW THE PLAN WAS DEVELOPED

**T**he US Environmental Protection Agency picked this project for a select “Community Legacy” grant, awarded to only five groups to develop standout models for improving the Chesapeake Bay. Christie Todd Whitman, national administrator, EPA, said she hopes for more from Paradise Creek. Standing on the banks of the creek on July 29, 2002, the silo of Giant Cement rising behind her, Whitman praised The Elizabeth River Project as the model for “partnerships that will actually bring us the kind of environmental benefits that we’re all looking for... Citizens, local government and industry working together to assure that economic prosperity and environmental protection go hand in hand.”

Just such a diversity of interests met throughout 2002-03 **to ensure that this watershed management plan is “affordable,**

**effective and acceptable to the community,”** The Elizabeth River Project criteria for action. “Team Paradise,” as the planners became known, included almost 50 stakeholders and technical advisors, representing not only area universities and regulatory agencies, but all the major creek-side industries, the US Navy, the City of Portsmouth and area neighborhoods.

**C**reek residents emphasized the need to **safeguard peace, quiet and beauty for those whose homes front the creek.** The working-class neighborhoods already battle urban crime. Scientists and engineers presented an all-day workshop for the team to assess the creek’s most serious challenges, with Portsmouth City Manager Luke McCoy as keynote speaker. Four workgroups then took on the task of developing solutions to the creek’s leading problems: Team Sediment



Quality, Team Living Resources, Team Water Quality and Team Quality of Life. Serving as volunteers, the teams developed discussion papers, exploring the issues and options in detail. NOAA staff began developing a conceptual model of the creek's ecosystem to provide a framework for evaluating contamination.

Team Paradise reached consensus on key elements of a draft plan during an overnight retreat March 16<sup>th</sup> and 17<sup>th</sup> 2003, at Port Isobel, an island owned by the Chesapeake Bay Foundation. **But already, the plan was well into implementation.**

## IMPLEMENTATION UNDERWAY

**T**he US Navy's initial progress helped convince The Elizabeth River Project to select the creek in 2001, when the Navy completed a multi-million dollar cleanup of "black beauty" sandblast from creek headwaters at former New Gosport navy housing. Contacted to help with the watershed plan for the creek, the Southeastern Public Service Authority added stormwater improvements and a forested buffer to creek shores. **Giant Cement of Virginia set aside a 22-acre no-mow zone** for wildlife habitat near the creek mouth and spent more than \$25,000 on pollution prevention. The Cradock community turned out in force for an Earth

Day 2002 cleanup. Peck Land Co. agreed to a major wetland restoration with The Elizabeth River Project.

And, just as this plan was headed for press, the **Portsmouth City Council passed a unanimous resolution** to seek to create the Paradise Creek park in this plan. The council all wore boutonnieres of native flowers to be planted at the park. The date of the council's crucial vote was April 22, Earth Day, 2003.



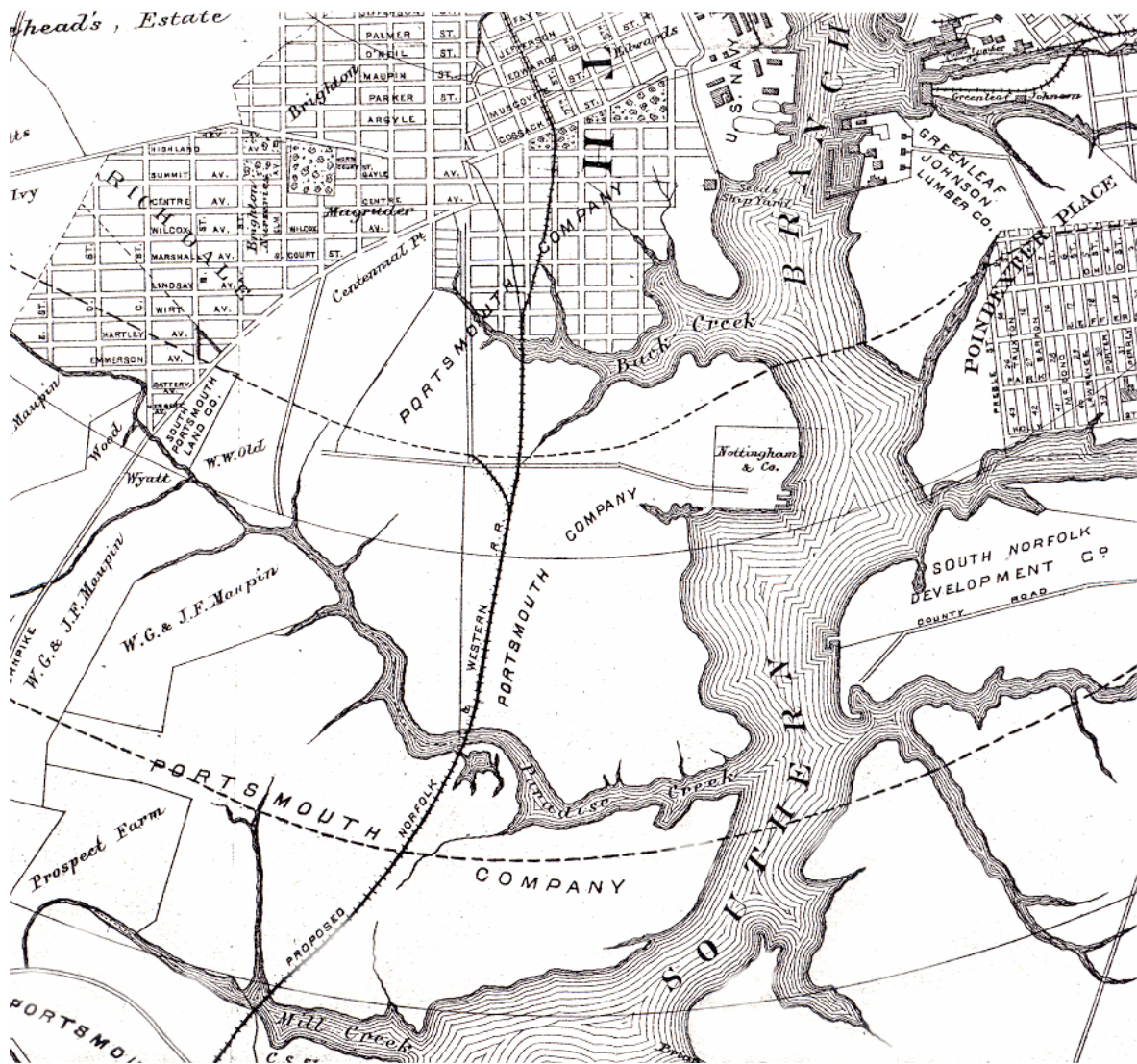
*The planning team engaged diverse representatives in hands-on learning. Here they dredge for oysters during a retreat at Port Isobel island. Chesapeake Bay Foundation's Chad DuChateau discusses the catch with (L-R) Simeon Hahn, NOAA; Landon Wellford, City of Portsmouth; Pam Boatwright and Robin Dunbar, The Elizabeth River Project.*

## OVERARCHING CONCERN

In finalizing the plan, Team Paradise identified an "overarching concern" to guide implementation:

- All watershed management activities resulting from this plan should reflect an **overarching concern for enhancing and protecting the quality of life for humans** on the creek's urban shore. Quality of life is defined to include:
  - human health
  - responsible long-term management by educated citizenry and partnership of creek users
  - environmental justice, meaning that no action should place an unequal burden of pollution on low-income or minority populations
  - economic vitality/marketability of the watershed
  - safety
  - recreational and educational opportunities
  - aesthetics (preserving beauty and natural vitality)
  - peace through reduction of noise pollution
  - respect for privacy.

# EARLY HISTORY OF PARADISE CREEK



This 1893 map shows a shoreline recognizably similar to Paradise Creek today. It is rare for a shoreline to retain its original shape on the urbanized Elizabeth River. Courtesy Portsmouth Naval Shipyard Museum.

**P**eople are intrigued by the name. How did an urban waterway two miles long, industries on one side and working-class homes on the other, start out as Paradise Creek?

The name lived on from once-bucolic Paradise Plantation, located on the creek in early Colonial times, according to oral tradition. Library records indicate large plantations lined the shores of Paradise Creek throughout the 1800s. An 1817 ad in the *American Beacon* promoted the sale of “a plantation handsomely situated on the north shore of Paradise Creek ... 150 acres ... with an excellent

landing place for boats or lighters within a few yards of the house,” along with another 112-acre plantation for sale on the south side of the creek. Dr. Charles O. Barclay and Robert Barclay, cousins still living in Portsmouth, report that their family owned the 310-acre Barclay Farm on the southern shore of the creek, starting in 1801. The family cemetery is still located there, next to Cradock Middle School.

**With World War I came the rapid expansion of the Norfolk Naval Shipyard**, about two miles north of the creek. In 1918, the Barclay farm was

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sold to house shipyard workers, becoming one of the nation's first government-planned housing communities. **Thus was born historic Cradock, an independent town** until Portsmouth annexed it in 1960. Cradock still dominates the creek's southern shore. One of America's first planned shopping centers was established in Cradock. Other neighborhoods developed on the creek shores. Truxton, at the headwaters of the creek, became America's first planned community for African Americans, also dating to World War I and named for Navy Capt. Thomas Truxton. Along with Highland-Biltmore, on the southern shore, and Brighton and Prentis Park on the north shore, about 30,000 people now live in the immediate watershed of Paradise Creek.

**T**he Norfolk Naval Shipyard, the oldest and one of the largest navy yards in the nation, remains a major employer for the creek community.

**The shipyard's history intertwines with the environmental history of the creek as**

**well.** Much of the north shore of Paradise Creek served as a landfill for the nearby shipyard from World War II until as late as 1983. Contamination ranging from sandblast grit to mercury placed the landfills on the National Priorities List in 1999. Other industrial facilities made use of the creek as well. At a former peanut butter factory, Peck Iron & Metal opened a scrap yard on the north shore in 1945, mainly to recycle old military equipment after the war. The Southeastern Public Service Authority constructed a Waste to Energy Plant at one of the Navy landfill sites in 1985.

Other nearby creeks were completely filled in during the shipyard's expanding years, including Gosport Creek (Back Creek on the 1893 map, left). The current maps of the creek named Paradise, however, show much the same shoreline as in past centuries.

**Throughout time, our model creek has been among the most resilient sections of the Elizabeth River system.**



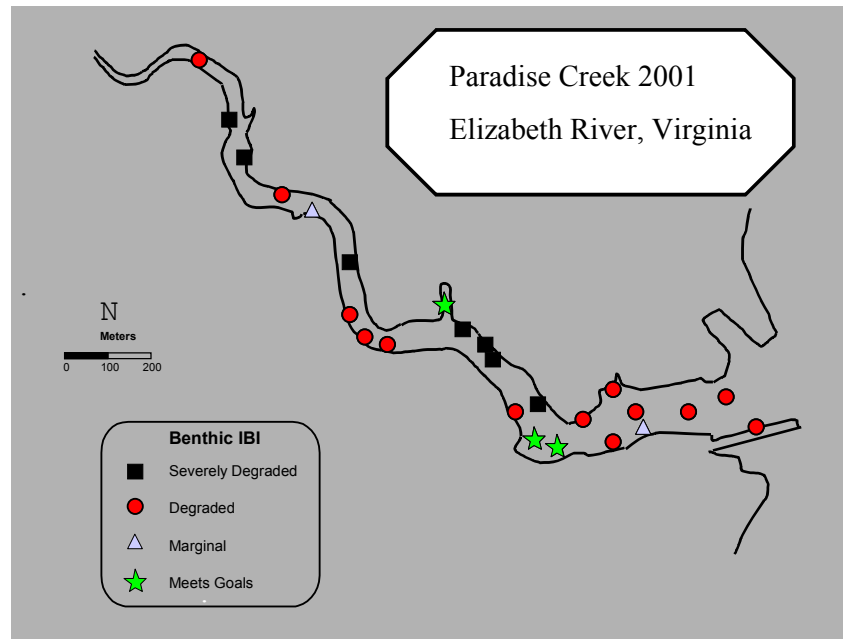
*Photo of Paradise Creek from 1914, courtesy Portsmouth Public Library. Despite the intense development that followed this period, including the development of Cradock in 1918 on the southern shore, large stretches of the creek look much the same today. Our plan draws on the creek's resiliency.*



# STATE OF THE CREEK BOTTOM TODAY

## *Down to two worms?*

*Old Dominion University, using the Benthic Index of Biological Integrity (Benthic IBI), found fewer species, lower numbers and lower weight among creatures at the bottom of Paradise Creek than meet the criteria for health on the Chesapeake Bay. In fact, two worms accounted for 86 percent of life in the creek bottom. Graphic courtesy Dr. Daniel Dauer, Old Dominion University.*



## BOTTOM LIFE: DEGRADED

**D**r. Daniel Dauer, Old Dominion University, sums it up this way: “The ultimate fate of all contaminants is to be deposited to the bottom.” On Paradise Creek, **decades of abuses have accumulated on the creek floor, impacting the foundation of the food chain.**

In a thriving creek, the bottom would be home to an abundance of diverse organisms, from worms to snails and clams, burrowing in the mud. In turn, these “benthic,” or bottom-dwelling communities, would provide food for many larger fishes, crabs, and birds. In 2001 sampling of benthic organisms in Paradise Creek for Virginia Department of Environmental Quality’s Elizabeth River Monitoring Program, Dr. Dauer found fewer species, lower numbers and less weight in Paradise Creek than should be expected.

In fact, he found 92 percent of the creek bottom to be degraded. While a healthy creek is rich in different kinds of life, the dominant species in Paradise Creek were

two worms accounting for 86 percent of the total individual creatures collected there.

In separate studies, the US Navy since 1986 has been collecting sediment data from Paradise Creek to determine the extent of bottom contamination from multiple sources including Navy and non-navy property, stormwater runoff, and tidal waters entering the creek from the Southern Branch of the Elizabeth River.

**N**avy sampling indicated **contamination from copper, lead, nickel, zinc and pesticides** in the upper reaches of Paradise Creek adjacent to the Navy’s Scott Center landfill. An area of the creek between the Navy’s Site 2 and Site 3 landfills (see Action 5) showed the highest concentrations of metals, with contamination from lead, mercury, cobalt, zinc, and chromium. In addition to the elevated levels of metals, this area contained the highest levels of polychlorinated biphenyls (PCB) in the creek. In the wetland area adjacent to Navy Site 3 landfill, contamination included copper, nickel, mercury, lead and pesticides.

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# CREEK WETLANDS TODAY

## PARADISE LOST

**T**idal wetlands in Paradise Creek have experienced more than a 50 percent loss since the 1940s, impacting wildlife habitat and the creek's natural filtering system.

Healthy wetlands act as a teeming nursery for aquatic life, while also trapping sediments, nutrients and pollutants before they reach the water. Walter Priest, Virginia Institute of Marine Science, identified 76 acres of wetlands remaining on Paradise Creek, with the greatest historical loss of wetlands in the headwaters and southern shoreline of Paradise Creek due to residential and commercial development.

The northern shoreline of the creek, while dominated by Navy landfills and heavy industry, nonetheless features a substantial

amount of surviving contiguous wetlands, according to Priest.

Historical maps from 1893 indicate that the a 35-acre area on the southern shore, east of Victory Boulevard and commonly referred to as the "Mudflats," was once a large tidal wetland that since has been filled with dredge material from the Elizabeth River. Cooper Street in the Cradock community adjacent to Paradise Creek was also a tidal wetland until the mid-1980s when it was filled for development of houses.

**Already, the effort to restore Paradise Creek has brought back 2.4 acres of tidal wetlands.** This includes 1.9 acres restored by the Navy at the New Gosport landfill in 2001 (Action 5) and 0.5 acres restored by The Elizabeth River Project in 2003 (Actions 1 and 2).



*The north shore features a substantial amount of surviving contiguous wetlands.*

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# CREEK WATER QUALITY TODAY

## RUNOFF IS A LEADING CONCERN

**P**aradise Creek regularly receives large, potentially polluted volumes of fresh water: not from a spring; not from industrial wastewater, but in the runoff from each rain.

In urban cities such as Portsmouth, stormwater runoff typically contains sediments, nutrients, bacteria, oil, grease and heavy metals. Built before runoff pollution was identified as a concern, the city's aging stormwater pipes are designed to send the runoff directly to the creek as quickly as possible, with no treatment except in isolated instances.

**Paradise Creek's stormwater pipes, emptying into the creek at 32 different points, drain as much as a third of the City of Portsmouth.** Only 10.2 acres (0.5 percent of the 2.9 square mile watershed) are filtered to remove pollutants. Runoff is thus a leading water quality concern.

CH2MHill, under contract to localities of the Hampton Roads Planning District Commission, analyzed data for the 45 "sub-watersheds" on Paradise Creek. A sub-watershed is the area of land most directly draining into the creek. The three largest of these sub-watersheds, accounting for 63 percent of the full creek watershed, are estimated to contribute 61 percent to 63 percent of the total pollutant load to the creek, Tim Hare, CH2Mhill, reported to Team Paradise. The next 10 largest sub-watersheds make up only 28 percent of the entire watershed and contribute between 25 and 28 percent of the total load of pollutants, Hare estimated.

**T**he Hampton Roads Planning District Commission study estimated the greatest stormwater pollutant load in Paradise Creek as total suspended solids, a



**Team Paradise at work.** Top, Cindy Linkenhoker, City of Portsmouth and Bill Hunt, North Carolina State University, talk stormwater at the Peck site. Bottom, The Elizabeth River Project staff on a field trip to find outfalls.

wide variety of materials such as silt, decaying plant and animal matter, industrial wastes, and sewage. These materials reduce the production of dissolved oxygen which is needed by most aquatic organisms to survive. In addition, **suspended sediments can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development.** On an annual basis, Paradise Creek receives approximately 178,332 pounds of total suspended solids, the study estimated.





### ***Encouraging results.***

*Stars represent locations of citizen water monitoring on Paradise Creek. Levels of dissolved oxygen and pH were within acceptable ranges during spring '03.*

## **CITIZEN MONITORING: WATER IS NOT THAT BAD!**

**S**ince no studies of water quality exist yet for Paradise Creek, a group of citizens stepped to the plate in spring 2003 to collect samples off docks, bridges and backyards. **Their encouraging results: at least for the limited data the volunteers were trained to collect, water quality in this creek is acceptable, compared to the rest of the Chesapeake Bay.**

The Elizabeth River Project recruited and trained the citizen monitors as a pilot project funded by the Alliance for the Chesapeake Bay and the Virginia Department of Environmental Quality. The citizens ranged from a Woodrow Wilson High School science class to creek residents to employees of the Navy and Giant Cement. From April to May 2003, they performed weekly water monitoring at five locations spanning the length of the creek. Data was collected for dissolved oxygen (D.O.), pH, water clarity, salinity, water depth, air and water temperature.

One of the most important water monitoring parameters is dissolved oxygen (D.O.), as it gauges a water body's ability to support life. Like humans, many forms of life in the water need adequate levels of D.O. to survive. The five-week D.O. average from Paradise Creek of 5.8 mg/l was greater than the Chesapeake Bay Program's draft criteria for open water, 5.0 mg/l over a 30 day average, indicating that during the monitoring period the creek's D.O. was not detrimental to the creek's life. However, the cool spring weather should be taken into

account as cooler water temperatures allow water to hold elevated amounts of D.O.

The citizens also measured for pH levels. Many plants and animals would have difficulty surviving if pH levels were greater than 9.0 in the creek or lower than 6.0. The average pH over the five week period was 7.4, with the lowest recorded value at 7.1 and the highest, 7.6. These results are within Virginia's standard for acceptable pH of 6.0-9.0.

**W**ater clarity is important to the health of a water body since the more suspended material in the water, the less light that can penetrate. Low levels of light prevent plants from growing, which produce oxygen for animals. In addition, suspended material can clog respiratory organs of bivalves and fishes. The average water clarity for Paradise Creek, measured using a secchi disk, was 0.06 meter which is relatively low water clarity. **This low water clarity may be one reason that submerged aquatic vegetation, such as eelgrass, does not grow in Paradise Creek.**

The citizens did not look at additional parameters requiring more difficult collection and analysis, such as the presence of dissolved metals or harmful bacteria. However, their efforts do show there may be adequate oxygen and appropriate pH levels for supporting restored creek life.

*Special thanks to citizen monitors: Valerie Bliss, Richard LeDoyen, Daniel Lewandowski, Michael Ralston, Kirk Smith, Curtis Williams and Mary Wyatt.*

# ACTION 1 - CLEAN THE CREEK BOTTOM



*Life on the bottom forms the foundation of the creek ecosystem. An unhealthy bottom means no food for more high-profile life such as herons and recreational fishes.*

## RESTORATION GOALS

- ***Develop a plan to clean up creek sediments*** determined to pose a serious risk to humans or the eco-system and begin implementation by 2007.
- ***Return at least three Superfund and/or “brownfield” upland sites to productive use*** through elimination of the risks to human and ecological health, including reducing flux of contaminants to the creek, resulting in increased marketability of individual properties and the creek area as a whole.

## SUMMARY

**O**ld Dominion University reported that 92 percent of bottom sediments sampled in Paradise Creek are degraded. Meanwhile, several large upland sites on the creek constitute “brownfields,” areas where contamination, or perceived contamination, prevents viable use of the property.

Nonetheless, the US Army Corps of Engineers has obtained federal funding to study how to clean the creek bottom, and a potential buyer has entered the most notorious upland brownfield, Peck Iron & Metal, in Virginia’s Voluntary Remediation Program.

## STEPS ACCOMPLISHED OR UNDERWAY

**T**he Corps of Engineers plans to begin a **\$1 million feasibility study in 2004** for the potential cleanup of sediments in Paradise Creek, along with other sites. Half the cost must come from a state or local sponsor.

Paradise Creek is a priority focus area for an Elizabeth River Sediment Restoration Partnership Committee, formed in 2002-03 to promote broad participation in voluntary efforts to clean up river sediments. US EPA, NOAA, US Navy, US Army Corps of Engineers, The Elizabeth River Project and private partners such as Peck Land Co., creek landowner, are participating. For its part, NOAA is developing a model to characterize major sources of toxic stressors in the creek watershed.

Pull-A-Part, a prospective buyer of the creek brownfield known as Peck Iron & Metal, has entered the 33-acre property in Virginia’s Voluntary Remediation Program to design and implement cleanup. Meanwhile, the current landowner, Peck Land Co., in 2003 **placed six acres of the site in permanent conservation** with The Elizabeth River Project, which in spring 2003 restored wetland areas along the shore. The Elizabeth River Project has recommended state-of-the-art sustainable development practices for Pull-A-Part, an auto recycling facility, once the purchase and cleanup are finalized.



*Alicia Lo Galbo, stooping, The Elizabeth River Project, helps volunteers plant wetland grasses at former Peck Iron & Metal. Comprehensive clean up and restoration are planned for this “brownfield.”*

## FURTHER STEPS IDENTIFIED

- Complete the NOAA-led conceptual model. Fill data gaps in cooperation with relevant partners.
- Develop restoration goals to guide remediation of contaminated sediments in Paradise Creek.
- Remediate the most toxic sediment hotspots as guided by sediment characterization.
- Obtain non-federal sponsors and pursue potential Congressional allocations to fund studies and any cleanup actions.
- Encourage and assist upland landowners with reducing or eliminating pollutants entering Paradise Creek.
- Complete the clean up and sustainable redevelopment of the Peck Iron & Metal

site to reduce inputs of pollutants into the creek and return the site to viability.

## INDICATORS OF SUCCESS

Scientists have selected the Baltic Clam, *Macoma balthica*, as a key “indicator species” to track for judging successful restoration of the bottom health of the creek.

A baseline of other benthic, or bottom-life, health is needed to track other biological trends such as the health of amphipods and grass shrimp.

Periodic benthic studies should be conducted to track the bottom community health in Paradise Creek.

**Watch this clam.** The Baltic Clam (*Macoma balthica*) was selected by scientists as the single best indicator species for the health of the creek bottom. A small, chalky white clam measuring up to an inch and a half, the Baltic is known to increase in abundance in estuarine systems when petrochemical discharges are reduced, and to be affected by elevated heavy metals in sediments. Normally, this is one of the most plentiful clams in the Chesapeake Bay.





## ACTION 2 - RENEW LIVING RESOURCES

### RESTORATION GOALS

- *Achieve a habitat corridor of restored and conserved open land*, including wetlands, forests and meadows, for at least 100 feet inland on the north shore of the creek and on the southern shore as practical, with areas set aside as parks or nature preserves as practical.
- *Place 250 acres in long-term conservation* in the Paradise Creek watershed by 2007.
- *Achieve judicious public access* at conservation areas to raise appreciation for living resources, through designs which protect privacy, safety and aesthetics for neighbors.
- *Replenish native wildlife.*

### SUMMARY

The watershed of Paradise Creek has become highly developed in the last century. This development has severely impacted the natural resources of the creek by reducing tidal wetlands and other habitat.

**Encouragingly, four industrial sites on the creek have already completed habitat restoration projects;** six acres are set aside in a legally protected conservation easement, funding is in hand for an oyster reef -- and a public park is planned with the City of Portsmouth.

### STEPS ACCOMPLISHED OR UNDERWAY

**The Portsmouth City Council voted Earth Day 2003 to create a public “Eco Park”** on 4.1 acres of Paradise Creek known as the Grimes boatyard, if sufficient funding is found for purchase and improvement of the site. The Elizabeth River Project and the City have applied for state funding to create the park on Victory Boulevard, with matching funds required. Site plans call for wetland restoration, wildlife habitat enhancement, a picnic pavilion and public access to the creek for canoes and kayaks.

Meanwhile, at other locations, The Elizabeth River Project has received a \$50,000 federal grant to create an oyster reef at the mouth of the creek in 2004. And four industrial sites on the creek have completed habitat restoration projects:

- The US Navy, recognized by the Elizabeth River Project as a “River Star” for voluntary stewardship, restored a 2-acre wetland at the headwaters of the creek in 2001, after excavating contaminated sandblast at its New Gosport site. The Navy planted a 4.5-acre forested buffer along the wetland on Earth Day 2002.
- Giant Cement of Virginia, also a River Star industry, set aside a 22-acre no-mow zone on the creek in 2002.
- SPSA’s Waste to Energy RDF Plant, another Paradise Creek River Star, in November 2002 planted a 1-acre “urban forest” and no mow zone.
- The Elizabeth River Project re-graded the shore of former Peck Iron & Metal in spring 2003 and held a volunteer planting May 17, 2003, to restore wetlands in 6 acres set aside for permanent conservation.

Finally, to improve public access, the City of Portsmouth plans a public overlook with education signs on the bridge over the George Washington Highway, along with stormwater improvements and wetland restoration.



Lyle Jackson admires Navy tree planting.



**Future Paradise Creek Park.** The City of Portsmouth will make the former Grimes boatyard into Paradise Creek Park if sufficient funding is found. This 4.1-acre site will include environmental restoration.

## FURTHER STEPS IDENTIFIED

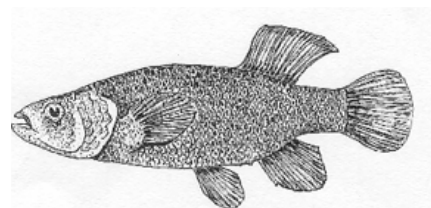
- Complete the exploration and development of the potential park at Grimes boatyard, or alternative sites. Conduct environmental evaluations, secure funding, purchase and improve a site for public access, wildlife habitat and demonstration of sustainable landscaping.
- **Generate a contiguous wetland habitat from the headwaters to the mouth of the creek**, to the maximum practical extent. Restore wetland gaps and forested riparian buffers, and encourage sustainable landscaping, along both shores.
- Improve shoreline and wetland habitat upstream of George Washington Highway by removing invasive, non-native grasses (*Phragmites*) and planting native wetland grasses (*Spartina*).
- Plant two of the Navy landfill areas with upland, warm-season grasses to create meadow habitats. Consider limited public access at the third Navy site (Action 5).
- Finalize a land-use strategy for conservation of additional sites, taking into account the needs of the City of Portsmouth, Navy and other major landowners. Plan should promote permanent conservation easements as the priority for long-term conservation and include an active forestry plan. Plan should give special consideration to stream restoration in the headwaters area; conservation at the Barclay Cemetery next to Cradock Middle School and the “Mudflats,” a 35-acre former dredge spoil

site; and public access on Alabama Avenue at the George Washington culvert.

- Bring back wildlife by measures including: Create additional oyster reefs as feasible. Reintroduce other native bivalves to the creek. Restore fish habitat. Create avian resources including nest platforms, boxes, and areas.
- Establish a forestry and vegetation baseline using Geographic Information System technologies to inventory upland, buffer, and wetlands plants and trees. Also to achieve a baseline for fish and bivalve species in the creek and track over time.

## INDICATORS OF SUCCESS

- **Judge success with restoration of creek habitat** by tracking health and abundance of these indicator species: the mummichog (*Fundulus heteroclitus*) and sheepshead (*Cyprinodon variegatus*) minnows and grass shrimp (*Palaemonetes* spp).
- Develop a citizen wildlife monitoring program with Virginia Department of Game and Inland Fisheries and Department of Conservation and Recreation.
- Conduct bird surveys. Track acreage achieved toward goals; gauge success of oyster reefs.



The mummichog minnow (*Fundulus heteroclitus*), an indicator species.

## ACTION 3 - IMPROVE WATER QUALITY

### RESTORATION GOALS

- **Implement innovative solutions to stormwater pollution** to address those sub-watersheds with highest impact on the eco-system, and provide maximum practical storm water treatment for new developments.
- By 2007, **treat stormwater runoff from 250 acres** in the creek watershed.
- **Develop and implement a targeted outreach stormwater strategy** to educate the public regarding reuse of stormwater and sustainable landscaping practices within the Paradise Creek watershed.
- **Develop a plan** for a reliable source and method **for water quality monitoring**. Establish a baseline and begin to monitor.



*Team Paradise examines a map of stormwater outfalls on the creek. Paradise Creek receives runoff from as much as a third of Portsmouth.*

### SUMMARY

**T**he 2.9 square-mile sub-watershed of Paradise Creek is characterized by an aging stormwater infrastructure. All creek land uses - heavy industrial, residential, commercial and military - **contribute to stormwater runoff as a leading source of new pollution in the creek.** Rain barrels offer a simple way to keep runoff out of the creek. The Elizabeth River Project and partners are pursuing many innovations.

### STEPS ACCOMPLISHED OR UNDERWAY

**T**he groundwork for innovative stormwater projects for Paradise Creek was laid in 2001-02 when The Elizabeth River Project and partners, led by William Hunt, North Carolina State University, designed a series of projects now awaiting funding for implementation. Rain gardens, stormwater wetlands and mechanical devices are outlined in Hunt's conceptual designs (*Elizabeth River Runoff: Win-Win Solutions*, The Elizabeth River Project).

Meanwhile, the City of Portsmouth is working toward construction of a dry stormwater best management practice (BMP) at the Fredrick Blvd/264 interchange, as well as stormwater improvements with public education potential at the George Washington Highway culvert on Paradise Creek.

To increase community involvement in addressing stormwater pollution, The Elizabeth River Project is seeking grant funding for workshops to teach the creek community to reuse stormwater through rain barrels, and reduce impacts with sustainable landscaping. These concepts are also taught with exhibits and activities at The Elizabeth River Project's new River Information Center.





*Rain gardens at Cradock Middle School, across the street from this outfall, would help keep toxic runoff out of the creek.*

## FURTHER STEPS IDENTIFIED

- Develop a plan for monitoring water quality, identifying potential implementing agencies and applying a wet weather monitoring strategy developed by The Elizabeth River Project and the state. Collect and analyze water quality data. Establish a baseline in conjunction with other sampling on the creek.
- **Use water quality data, as available, to analyze and prioritize the following initial list of projects for implementation,** adding projects as they are identified:
  - Promote maximum stormwater treatment at the Peck Iron & Metal “brownfield” site (see Action 1), both for current conditions and future development plans such as those of Pull-A-Part, a potential purchaser.
  - Conduct stream improvements to reduce runoff impacts at creek headwaters downstream of Elliot Avenue.
  - Improve treatment of runoff from 70 acres at the intersection of Cooper and Reid Streets in Cradock.
  - Install bioretention on the Cradock High School side of George Washington Highway.
  - Install bioretention at the Oasis Carwash, located adjacent to the culvert crossing Paradise Creek on George Washington Highway.
  - Install bioretention and replace parking lot with permeable pavement at St. Mark’s Baptist Church, Frederick Boulevard.
  - Install rain gardens at downspouts where practical in the community, such as apartments on Elliot Avenue.
  - Install bioretention and replace existing parking lot with permeable pavement to treat stormwater runoff at the baseball field on Elliot Avenue behind St. Mark’s Church.
  - Install rain gardens (bioretention) as a demonstration for other portable classrooms at Cradock Middle School’s portable classrooms.
  - Evaluate the potential use of both ultra-urban and commercially-manufactured best management practices (BMPs) for industrial sites such as SPSA.
  - Evaluate the Victory Boulevard “Mudflats” as a stormwater treatment area and/or habitat conservation area.
- **Educate the community of Paradise Creek about reusing stormwater** and sustainable landscaping by conducting educational workshops.
- Display The Elizabeth River Project’s guides, *Wildlife Habitat Guide for Restoration for Landscaping in the Elizabeth River Watershed* and *Everybody needs a rain barrel!* on The Elizabeth River Project’s web site, [www.elizabethriver.org](http://www.elizabethriver.org).

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## INDICATORS OF SUCCESS

- Acres of runoff treated with stormwater controls.
- Number of people participating in rain barrel workshops; knowledge survey before and after workshops.
- Fish, bivalve, and benthic monitoring to determine health as a water quality indicator.
- Acres of sustainable landscaping planted.



*The creek narrows in its Western extremes. A public overlook is planned at this site looking down from George Washington Highway. The city is improving stormwater management at this location.*

## ACTION 4 - ENHANCE QUALITY OF LIFE



SPSA volunteers plant an "urban forest" in November 2002.

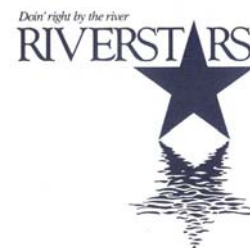
### RESTORATION GOALS

- ***Implement a comprehensive public relations and outreach plan*** to educate the citizens about creek restoration, history and stewardship opportunities.
- ***Recruit 250 new Elizabeth River Project members*** from the Paradise Creek watershed in five years.
- ***By 2007, actively engage 10 high priority and 10 medium priority River Stars in the program, reducing pollution and creating habitat.***
- ***Hold three successful public events*** in the next five years.
- ***Install educational and informational signs*** at public access points.
- ***Reduce litter*** to the maximum extent practical.
- ***Establish "no wake" zones*** for boating along Paradise Creek from the mouth of the Elizabeth River to reduce erosion, noise pollution, and collision hazards.

### SUMMARY

**C**radock and other neighborhoods on the creek are recovering from a long economic decline. Crime, litter, noise, industrial and residential pollution and the presence of Superfund sites and industrial brownfields all have impacted quality of life for watershed residents. Meanwhile, industrial and government facilities on the creek struggle with cost and liability of addressing pollution.

**Real estate values and community morale are already on the upswing** with the improvement of the creek's environmental health. Industrial and government facilities, meanwhile, are participating as "River Stars" with The Elizabeth River Project and are reaping savings and reduced liability from voluntary pollution prevention practices.



### STEPS ACCOMPLISHED OR UNDERWAY

**Three of the largest industrial sites on the creek have recently documented success** as River Stars: SPSA, Giant Cement of Virginia and Norfolk Naval Shipyard (see Action 2 for a description of some of their projects). The Elizabeth River Project in 2002-03 launched a campaign to engage other industries on the creek in achieving results. Team Paradise helped prioritize a list of high and





*Cradock's Helping Hands help remove 9,000 pounds of trash from the creek shore.*

medium priority River Stars. The Elizabeth River Project is implementing a recruiting strategy.

**Public education is also underway at an intensive level**, with at least a dozen presentations to civic groups in the watershed, including The Elizabeth River Project's May 17, 2003 event to present the draft of this plan to the community. A pilot program in citizen monitoring offered a special opportunity to engage the public (see page 8) with state funding. The Elizabeth River Project has applied for federal funding for community workshops (see Action 3) and The Elizabeth River Project has helped organize several litter pickups, including 9,000 pounds removed in Cradock in 2002.

## **FURTHER STEPS IDENTIFIED**

- Encourage long-term community stewardship and volunteer involvement through activities including: citizens participating in Adopt-A-Stream/Spot, oyster gardening, backyard sustainable landscapes with native plants, reducing fertilizers and pesticides in runoff, clean-ups, volunteers involved in community restoration plantings, and citizen water monitoring.
- **Reach all high and medium priority facilities in the Paradise Creek watershed by 2007** with marketing of The Elizabeth River Project's River Stars program for industries. Engage volunteer experts and peer River Star representatives to help perform site visits and provide recommendations on pollution prevention and wildlife habitat projects. Document and recognize measurable results at The Elizabeth River Project's annual banquet for River Stars. Recognition requires regulatory compliance as well as documentation of significant voluntary pollution prevention and/or habitat enhancements, determined by peer review.
- Potential priority sites for consideration in the River Stars program include Peck Land Co./Pull-A-Part, Superior Marble and Stone, RADVA, Accurate Marine, Butch's Auto, Turner Auto, Oasis Car Wash, and Atlantic Cable.
- Encourage an ongoing partnership between River Stars and the community by encouraging community attendance at River Star events, plantings and open houses.
- **Recruit and train River Voices**, volunteers participating on The

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Elizabeth River Project's speakers bureau, to present the five-year plan at community events. Widely distribute this plan and the accompanying map/brochure. Use media, signage, advertising, and The Elizabeth River Project's web site to promote the plan and how residents can help.

- **The Elizabeth River Project should recruit River Star schools** in the Paradise Creek watershed and serve as a resource for schools and youth organizations with Virginia Standards of Learning/grade level activities.
- Enlist the horticulture club at Cradock's horticulture extension program to grow native plants for education and outreach in the watershed.
- **Establish no wake zones throughout the creek.** Install no-wake buoy at the mouth of the creek. Distribute brochures educating boaters about the no wake zones in the Paradise Creek at all city docks and to property owners along the creek.
- Partner with community organizations to address sources of litter and promote clean-ups including an annual litter clean-up.

- Consider appropriate placement of trashcans at public access areas.
- **Partner with organizations** such as SPSA, Portsmouth Clean Community Commission, and Virginia's Department of Conservation and Recreation for supplies for clean-ups.

## INDICATORS OF SUCCESS

- **Increased property values.**
- Increased economic vitality.
- Use the resource book of the National Park Service, *Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors*, to help track improvements in the watershed communities.
- **Pounds of pollution prevented** and acres of habitat restored or created by industries and residents.
- Increased numbers of River Star Schools participating.
- Pounds of litter at clean-ups.
- Number of people reached through speaking engagements, plantings, clean-ups, media, events, web site, and distribution of plan/brochures.



*Giant Cement, River Star, is a dominant feature on the Paradise Creek shoreline. Giant created a 22-acre no mow zone and is implementing voluntary pollution prevention practices.*

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## ACTION 5 - TRANSFORM NAVY LANDFILLS

### RESTORATION GOAL

- *Restore Navy landfill sites on Paradise Creek to productive use,* helping achieve the relevant goals in this plan for water quality, sediment quality, living resources and quality of life.

### SUMMARY

The Environmental Protection Agency added Norfolk Naval Shipyard in 1999 to the National Priorities List, or "Superfund" list, of contaminated properties. The primary concern was potential impacts to Paradise Creek and the Elizabeth River due to seven contaminated sites at three locations on Paradise Creek. The combined size of these sites is about 75 acres.

**Navy restoration is underway at the landfills**, starting in 2001 with removal of sandblast grit and wetland and upland habitat restoration at Site 1, next to former New Gosport Navy housing. The Navy is considering Team Paradise recommendations for the additional sites, including removal and restoration at Site 2, off the Navy's Scott Center Annex; and a 70-acre "wildlife mecca" across Victory Boulevard at the largest landfill, Site 3, and adjacent Site 7, an old chemical pit.

### ACTIONS ACCOMPLISHED OR UNDERWAY

- **The Navy addressed Site 1 in 2001 with the removal of "black beauty," or sandblast abrasive.** The excavated area was planted as a wetland. The Navy and The Elizabeth River Project planted a 4.5 acre upland buffer with volunteers on Earth Day 2002. Navy Admiral David Architzel and Portsmouth Mayor James Holley dedicated the "Gateway to Paradise," launching the restoration of the creek.
- Remediation planning is being finalized for the other landfills.
- At a separate but related site on the edge of the Paradise Creek watershed, the Navy and Atlantic Wood Industries resolved a stalemate of more than a decade to remove contamination from a lagoon.



*Site 3 and 7 Navy landfills dominate the lower shore here. After capping, Site 3 should be a wildlife mecca.*



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## FURTHER STEPS FOR SITE 3, PROPOSED WILDLIFE MECCA; AND SITE 7

- **Create a 70-acre wildlife mecca, the only native grassland habitat in the creek watershed**, after the Navy caps the contamination with clay. Add a layer of top soil, plant with native, warm season grasses and wildflowers such as sunflowers, and add shallow ponds as watering places for wildlife. Native warm-season grasses provide extremely valuable habitat for ground-nesting birds and many mammals. These inexpensive grasses would also stabilize the cap while reducing mowing costs to the Navy. Managing a meadow of native grasses costs about one-sixth as much per year as mowing non-native turf, saving the Navy as much as \$25,000 at this site over five years.
- This is the most important area for long-term conservation among the Navy landfills. Consider this and the other Navy landfills for the Navy's Watchable Wildlife program. To provide maximum wildlife habitat, public access should be severely limited at Site 3 unless no other significant public access areas are feasible on the creek.
- In a small area of mercury contamination at Site 3, consider removing or breaching an existing berm if mercury levels do not warrant removal. Use the soils removed to cap the mercury. If the mercury is removed, consider creating an "ephemeral" or seasonal pond for frogs and other wildlife. Consider wetland restoration and removal of *Phragmites* if berm re-grading is conducted.
- Minimize the footprint of capping on Site 3 to stabilize the slope and protect mature trees.

- **Consider stormwater treatments** at Sites 3 and 7, including naturalizing or "daylighting" the storm sewer between the western and eastern portions of Site 3 as far as possible; also considering bioretention and adding a native habitat buffer. Consider rehabilitating existing stormwater ditches in partnership with the City of Portsmouth. Retain and treat runoff at Site 7, with reforestation.

## FURTHER STEPS FOR SITE 2, SCOTTS ANNEX

- A preliminary Navy plan was to pave the landfill as a parking lot. **Team Paradise instead recommends removing the landfill**, planting a wetland and forested buffer and removing invasive, non-native reed grass (*Phragmites australis*).
- If excavation is not feasible, the next-best alternatives include: 1) Instead of the parking lot, cap the landfill with soil and plant native meadow grasses. 2) If the Navy must install a parking lot, treat the stormwater runoff with bioretention and maximize the buffer.
- Expand the marsh area.
- **Consider limited public access** including trails, boardwalk and a possible teaching platform, so long as impacts to wildlife are determined to be minimal and Navy security issues are addressed. Balance impacts to wildlife with benefits of increased public awareness.

## FURTHER STEPS FOR SITE 1, NEW GOSPORT

- Place the buffer area, including reforested uplands, in long-term conservation.
- Replant the buffer vegetation where damaged by a 2002 drought.

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# GLOSSARY

**Best Management Practice (BMP)** - the most effective, practical devices and practices designed to reduce pollution in stormwater runoff serving to decrease the amount of pollution entering a watershed.

**Benthic** - referring to the bottom of a body of water such as an ocean or estuary; benthic organisms live on, attached to or within the sediment found at the bottom.

**Bioretention** – the stormwater treatment practice of collecting, storing, and treating stormwater runoff through the use of vegetated depressions to reduce the amount of pollution entering a watershed.

**Brownfield** – “any land in the United States that is abandoned, idled, or under used because redevelopment and/or expansion is complicated by environmental contamination that is either real or perceived.”<sup>1</sup>

**Conservation easement** – a legally binding, voluntary agreement between a landowner and a non-profit organization, historic preservation organization or government by which landowners voluntarily restrict land use to promote conservation.

**Corridor** – vegetated areas connected together that serve to increase the value of wildlife habitat.

**Day lighting** – refers to removing a culvert to restore a stream flow to a more natural condition.

**GIS** – (Geographical Information System) a computerized system designed to store, retrieve, map, and analyze geographic data.

**Meadow habitat** – a wildlife area characterized by grass and wildflower vegetation and the organisms associated with these areas.

**Rain barrel** – a rain collection tank designed to capture stormwater from impervious roof surfaces and allow the stormwater to be reused for purposes such as irrigation.

**Riparian buffer** – strips of vegetation along rivers, stream banks, lakes, ponds and other

waterways which provide valuable wildlife habitat and also help improve water quality.

**River Star** – a voluntary program between the business sector and The Elizabeth River Project dedicated to pollution prevention and restoring wildlife habitat in the Elizabeth River Watershed.

**Sediment Remediation Feasibility Study** – a study to examine the most feasible solution to clean up contaminated sediments taking into account environmental and economic issues.

**Stormwater runoff** – water flowing over the land surface from rain, melted snow or irrigation.

**Superfund** – “the Federal government's program to clean up the nation's uncontrolled hazardous waste sites.”<sup>2</sup>

**Sustainable landscaping** – refers to developed areas that provide wildlife habitat which can be maintained into the foreseeable future.

**Uplands** – refers to a geographic area not defined as a wetland and not covered with water.

**Watershed** – a defined geographic area within which water drains into a particular body of water such as a creek or river.

**Wetland** - land defined by water, hydric soils, and hydrophytic vegetation. These areas often form a transition area between an upland and the water body itself.

## REFERENCES

<sup>1</sup>[http://cfpub.epa.gov/superapps/index.cfm/fuseaction/faqs.viewAnswer/question\\_id/104/category\\_id/7/faqanswr.cfm](http://cfpub.epa.gov/superapps/index.cfm/fuseaction/faqs.viewAnswer/question_id/104/category_id/7/faqanswr.cfm). 2003. Superfund Frequently Asked Questions.

<sup>2</sup><http://www.epa.gov/superfund/welcome.htm>. 2003. Welcome to the Superfund Web Site. Hampton Roads Planning District Commission. *A Guide for Maintaining and Operating BMPs*. Kesselheim, A.S., Slattery, B. E., Higgins, S.H., and M. R. Schilling. 2000. *Wow! The Wonders of Wetlands*. The Watercourse, MT. *Low-Impact Development Design Strategies An Integrated Design Approach*. (2000). Department of Environmental Resources, MD.

# RESTORING A CREEK — TOGETHER



*The \$100,000 check that launched the plan, presented July 29, 2002, by Christie Todd Whitman, former Administrator, US EPA. She is flanked by local, state, federal and private partners.*

*Princess Elizabeth, for whom the river was named, returns to The Elizabeth River Project as educational host for a tropical celebration of the “Return to Paradise (Creek).”*



*Planting the “Gateway to Paradise” at the Navy’s New Gosport restoration site on Earth Day 2002. Mayor James Holley of Portsmouth, far left, cut the ribbon.*





*Bob Jackson, The Elizabeth River Project volunteer, helps plant native marsh grass at Peck Iron & Metal on May 17, 2003.*



*Joe Rieger, far left, project scientist, The Elizabeth River Project, plugs in a wetland sprig at Peck Iron & Metal with volunteers and Alicia Lo Galbo, far right, another staff scientist. Volunteers are needed for every aspect of the creek restoration.*

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## HOW YOU CAN HELP

**B**efore this plan could be finished, partners were already implementing so many of the initial projects identified that their sites almost form a connected corridor along the entire north shore of Paradise Creek. We only need keep that kind of momentum going to meet the Environmental Protection Agency's expectations for a model plan for the nation.

Much remains to be done, but with a watershed that is just 2.9 square miles and a time-frame of only five years, this plan is exciting partly because it is so manageable. Join us in Paradise Found.

- Become a member of The Elizabeth River Project. Our goal is 250 members in the Paradise Creek watershed by 2007.
- Plant native species, reduce fertilizers and pesticides and follow other sustainable landscaping practices in your own backyard or business, using The Elizabeth River Project's *Wildlife Habitat Guide for Restoration and Landscaping in the Elizabeth River Watershed*. The Elizabeth River Project plans community workshops on this topic as well as how to install rain barrels to reduce runoff

problems. Our guide, *Everybody needs a rain barrel!* also tells you how.

- Enlist your creek business as a River Star! Priority facilities are those with the potential to reduce toxics, a high volume of stormwater runoff and promising potential for wildlife habitat.
- Volunteer. The Elizabeth River Project needs volunteers for citizen monitoring, speaking to civic groups, organizing clean-ups and advising the restoration as it moves forward.

Barry Lopez, environmental pioneer, once summed up the rewards: *"I know of no restorative of heart, body and soul more effective against hopelessness than the restoration of the Earth."*



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### **YES, I/we want to be a part of the restoration of Paradise Creek.**

\_\_\_\_ **Sign me/us up** as a member of The Elizabeth River Project, the organization leading the creek restoration. Individuals: \_\_\_\_ \$10 student, \_\_\_\_ \$25 basic, \_\_\_\_ \$35 contributing, \_\_\_\_ \$50 supporting, \_\_\_\_ \$100 sustaining, \_\_\_\_ \$500+ major donor. Corporate: \_\_\_\_ \$175 basic, \_\_\_\_ \$250 contributing, \_\_\_\_ \$500 supporting, \_\_\_\_ \$1,000+ major donor.

\_\_\_\_ **Send me** (\$5 ea. postage & handling): \_\_\_\_ Wildlife Habitat Guide, \_\_\_\_ Rain Barrel Guide.

\_\_\_\_ **Contact me about:** \_\_\_\_ River Star program for industries; \_\_\_\_ Volunteer work.

Name \_\_\_\_\_ Organization \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-Mail \_\_\_\_\_

Mail to The Elizabeth River Project, 475 Water Street, Suite C103A, Portsmouth, VA 23704, or call us at 757-399-RIVR. Visit us on-line at [www.elizabethriver.org](http://www.elizabethriver.org)

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# TEAM PARADISE

*Special thanks to the team of stakeholders and technical advisors that developed this plan:*

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*Joe Rieger*, Project Scientist  
*Alicia LoGalbo*, Water Quality Scientist  
*Robin Dunbar*, Outreach Coordinator

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*Kathy Mooney*, Norfolk Naval Shipyard  
*Hugo Valverde*, Hampton Roads Planning  
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*Landon Wellford*, City of Portsmouth

## TEAM QUALITY OF LIFE

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*Mike Barnett*, SPSA - Waste to Energy RDF  
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*Ted Hinson*, Giant Cement Virginia, Inc.  
*Lyle Jackson*, The Elizabeth River Project  
*Glenn P. Markwith*, Commander, Navy Mid-  
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